

## PATENT SPECIFICATION

587.163



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## COMPLETE SPECIFICATION

## Improvements relating to Tubes or Packages and Methods of Making the same

We, WINGFOOT CORPORATION, a Corporation organised under the laws of the State of Delaware, United States of America, of 1144, East Market Street, Akron, State of Ohio, United States of America, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to tubes or packages and has for its object to provide an improved tube or package incorporating a readily visible protected indicia strip or label.

To this end the invention consists in a tube comprising at least two helically wound plies of material the outer at least of which is transparent with at least one strip of indicia bearing material interposed longitudinally therebetween.

The invention also includes a method of making such tubes which comprises feeding a strip of material obliquely to a rotating mandrel to form a helical ply, and while the mandrel is rotating laying a strip of indicia bearing material longitudinally thereof and then feeding a strip of transparent material obliquely to the mandrel to form a helical ply over the longitudinal strip.

The invention further includes a package comprising a length of tube made as above with one end permanently closed and the other end closed by a removable cap.

This invention relates particularly to the flexible type of tube suitable for packaging tooth paste, shaving cream, and the like, and for the manufacture of bags, etc. More particularly, it relates to the use of transparent film for this purpose. One of the objections to the use of such tubes for the packaging of candy bars, etc. has been the difficulty of applying labels thereto. According to the invention this difficulty is overcome by laying the longitudinal indicia bearing strip or label under the outer transparent helical ply. This strip or label may be printed in any desired manner, and it may be as wide as the circumference of the tube or narrower. It need not be of the same com-

position as the helically wound plies. For example, it might be a strip of metal foil or paper bound between two helices of regenerated cellulose, rubber hydrochloride or the like.

The helical plies need not be of the same composition. The inner ply may, for example, be rubber hydrochloride and the outer ply regenerated cellulose. This may be desirable where the resistance of rubber hydrochloride is utilized on the interior of the package for contact with the contents of the package, and the regenerated cellulose is used to make the package more gas resistant. It is generally recognized that the different film materials have different properties and are desirable for use in different locations. This invention makes possible the combination of a variety of film materials, one being used for the inner ply and another for the outer ply. A third ply may be applied either before or after the interposition of the longitudinal ply. It is thus seen that the number of helical plies is not limited, and, furthermore, the number of longitudinal plies is not limited. Where three helical plies are employed, a longitudinal ply may be laid down between each of the helical plies. In any such way, one may combine regenerated cellulose, rubber hydrochloride, cellulose acetate, glassine, gelatine film, Nylon (a plastic manufactured by the E. I. du Pont de Nemours and Company), Saran (a copolymer of vinyl chloride and vinylidene chloride manufactured by the Dow Chemical Company), and a vinyl film of any type or any other type of film material, including ordinary paper and foils, such as tin, aluminum, lead, etc. Thus, packages may be built up having desirable properties, such as high resistance to certain gases or liquids, etc., and the inner ply may be composed of material which is highly resistant to the contents of the package.

The invention will be further described in connection with the accompanying drawings, in which Fig. 1 is a plan view of the equipment employed, Fig. 2 is a plan view of the mandrel on a somewhat enlarged scale showing the application of

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the various plies thereto, Fig. 3 is a section on the line 3—3 of Fig. 1, Fig. 4 is a section of the finished tube on an enlarged scale, Fig. 5 is an end view of the tube, and Fig. 6 illustrates a package made according to the invention.

The units 1 and 2 are stationary belt assemblies of a usual type, for helically wrapping tape material onto a mandrel.

Both units are identical but are shown in reversed positions. The mandrel 3 is supported at one end only in the bracket 4 and is driven from the pulleys 5. Starting from the right-hand end of the mandrel and progressing toward the left, using for the sake of illustration the production of a tube formed of two plies of rubber hydrochloride film, between these a longitudinal encircling ply of aluminum foil and a narrow ply of paper printed to form a label, the materials are applied to the mandrel as follows:—

When an inner ply of rubber hydrochloride is employed, it has been found desirable to first wrap the mandrel with a tissue slip sheet. If the rubber hydrochloride is wound directly upon the mandrel, it is apt to cling somewhat and not progress as smoothly as desired. Therefore, at the unit 2, the tissue slip sheet 7 is first fed obliquely to the mandrel 3 and is wound around the same. Then also, at the unit 2 the rubber hydrochloride strip 8 is fed obliquely to and wound around the mandrel and over the tissue slip sheet. Adjacent plies of the rubber hydrochloride overlap somewhat. Then, by means of the mechanism shown, the metal foil is supplied from the roll 9 and the paper label from the roll 10. Then, at the unit 1 another strip of rubber hydrochloride 11 is fed obliquely to and wound over the longitudinal plies with a slight overlap of adjacent turns.

The assembled tube then passes through the oven 12 where the overlapped portions of the rubber hydrochloride strips are heated sufficiently to become united. The paper label may be coated with a heat-sensitive adhesive on its inner surface, as may also the foil or other non-heat-sealable material. If preferred, means may be provided for the application of liquid adhesive to any ply.

Beyond the oven, the finished tube 13 is cut to lengths by the knife 14. The lengths are illustrated at 15. The funnel-shaped device 16 is merely a guide to aid in conveying the tube to the knife.

The units 1 and 2 are identical in construction and, as shown in the drawing, are merely reversed. The essential feature of each unit is the belt 20, which passes over suitably supported pulleys 21 and 22.

Referring to the unit 2, it will be seen

that as the belt leaves the pulley 21, it is wrapped one turn around the mandrel 3 and then proceeds to the pulley 22. The belt is driven from a main drive shaft directly below the mandrel by a pair of bevel gears 23, which may be of any usual design. The slip sheet 7 is first fed to and wound around the mandrel, and then the rubber hydrochloride strip 8 is similarly fed to an wound around the mandrel, and the belt 20 imparts a helical motion to the tube thus formed. The tube is revolved rapidly around with the mandrel as the various plies are applied to it.

Between the two units 1 and 2, the mandrel passes through the hollow guide 30. This is mounted on a carrier which is rotated around the race 31 at the same speed as that at which the tube rotates. The rotation is imparted by the belt or chain 32, which passes over the pulley 33 and is driven from the main drive shaft. The two rolls 9 and 10 are mounted on the carrier and, therefore, revolve about the mandrel at the same speed as the tube. As the tapes are unwound from these rolls 9 and 10 and laid on the advancing tube, they are laid longitudinally along the tube because the carrier is rotating at the same number of revolutions per minute as the tube.

The wide strip of metal foil from the roll 9 is passed over the folder 35. The folder is shaped in such a manner that as the flat wide tape from the roll 9 passes over it and back toward the mandrel, it is cupped so that it is readily wrapped around the mandrel. The wrapping is completed by the hollow guide 30 as the fabricated tube product passes through it. Adhesive may be applied in any desired manner where adhesive is necessary. A narrow strip, such as the strip of paper 10a, may be laid longitudinally without passing over a folder, such as the folder 35.

To slacken the speed of the rolls 9 and 10 to prevent their feeding faster than the tube travels, each is equipped with suitable braking means, such as that indicated by the reference numeral 36, which comprises a strap and spring tensioning means (shown in Fig. 1).

After passing through the hollow guide 30 on the carrier, the tube continuing on the mandrel passes by the unit 1 where the belt is looped around the tube in the usual manner, and the second rubber hydrochloride strip 11 is applied just ahead of the belt.

The finished tube shown in Figs. 4 and 5 is formed of inner and outer helical rubber hydrochloride wraps 8 and 11 and between these the foil 9 and paper strip of label 10.

Although the invention relates more particularly to the manufacture of flexible tubes, the equipment and process are applicable also to rigid tubes of the postal-tube variety.

The tube formed in this manner is unusually strong. Due to the helical wrap, its circumferential strength is high. The longitudinal strength is, likewise, high, due to the inner ply or plies of material which run longitudinally. If the inner and outer plies are staggered, great strength is imparted to the tube. A bag made of flexible wrapping material of suitable composition manufactured as herein described may be advantageously used for the shipment of liquid products, such as lubricating oil, milk, and the like. Ordinary bag materials are not sufficiently strong for this purpose.

In the manufacture of tubes for shaving cream, etc., a plastic top is fastened to one end of such a bag, and, after filling, the other end is closed with a clamp or by a heat seal.

Bags are also easily formed from the tube by cutting it into lengths and closing one end by rolling the tube somewhat from one end toward the middle.

After filling, the bags may be closed in a similar way. Such bags are exceptionally strong, and when used in cylindrical shipping cases of no larger diameter than the diameter of the bags, they may be used for shipping liquids, etc.

A bag formed from such a tube is shown in Fig. 6. The end is closed by a metal clamp 40 fastened across one end. The end may be folded once or twice before clamping, if desired. The longitudinal ply 41 is used as a label and is printed before insertion in the tube.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A tube comprising at least two helically wound plies of material the outer at least of which is transparent with at least one strip of indicia bearing material interposed longitudinally therebetween.

2. A tube according to claim 1 including a longitudinal intermediate ply to which the strip of indicia bearing material is applied.

3. A tube according to either preceding claim in which all helically wound plies are of transparent material.

4. A tube according to any preceding claim is which the inner and outer plies are of materials having different characteristics.

5. A method of making a tube as claimed in claim 1 which comprises feeding a strip of material obliquely to a rotating mandrel to form a helical ply, and while the mandrel is rotating laying a strip of indicia bearing material longitudinally thereof and then feeding a strip of transparent material obliquely to the mandrel to form a helical ply over the longitudinal strip.

6. A method according to claim 5 in which a longitudinal ply is laid over the first helical ply and the indicia bearing strip is applied thereto.

7. A method according to claim 5 or 6 which also includes moving the formed tube helically of the mandrel.

8. A package comprising a length of tube according to any of claims 1 to 4 with one end permanently closed and the other end closed by a removable cap.

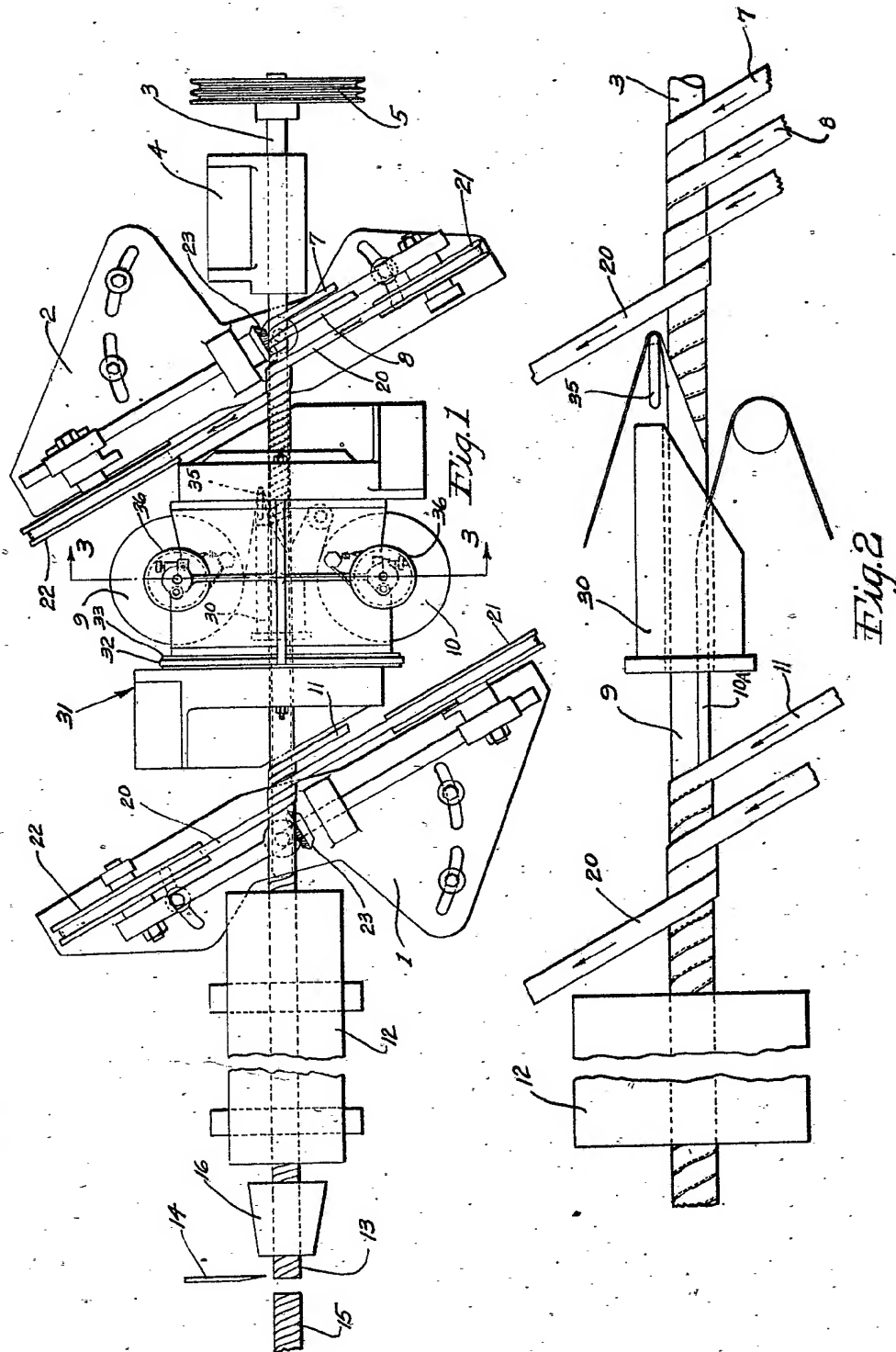
9. A tube substantially as described with reference to the accompanying drawings.

10. A method of making tubes substantially as described with reference to the accompanying drawings.

Dated this 26th day of May, 1944.

MARKS & CLERK.

[This Drawing is a reproduction of the Original on a reduced scale.]



[This Drawing is a reproduction of the Original on a reduced scale.]

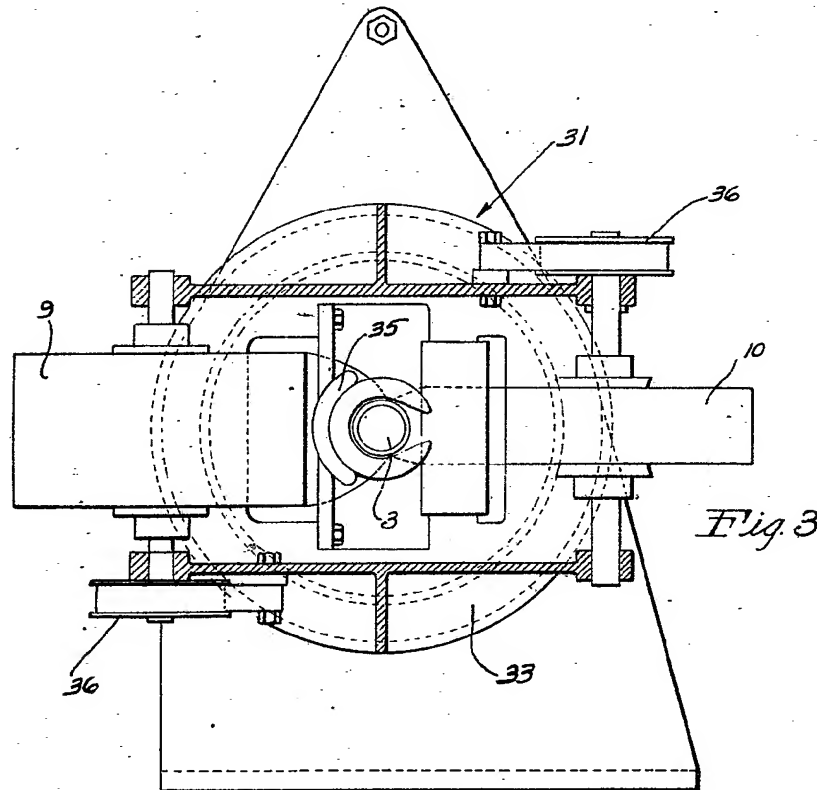


Fig. 3

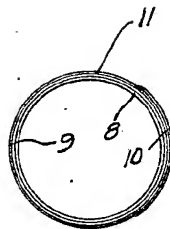


Fig. 5

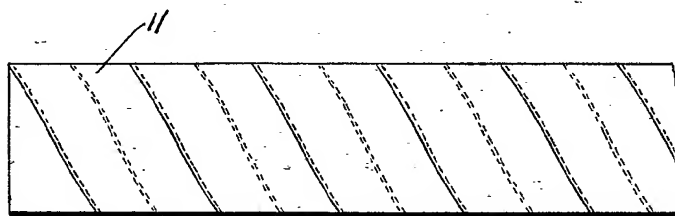


Fig. 4

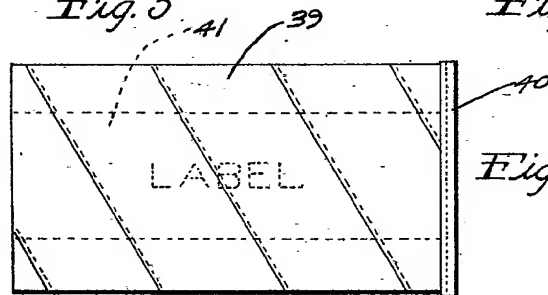


Fig. 6